

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal; and

said sink device is operable to respectively receive the isochronous data from said plurality of source devices in a timing that is synchronous with the reference signal, and to output the plurality of pieces of received isochronous data to a data processing device which is not connected to said transmission line in a timing that is synchronous with the reference signal.

2. (Previously Presented) The data transmission system of claim 1, wherein:

the data transmission on said transmission line is repeatedly performed for each transmission frame as a unit of transmission data;

the transmission frame has a frame header which contains information indicating the head of each transmission frame and an isochronous data slot which contains the isochronous data; and

said specific device is operable to transmit the reference signal information by including the reference signal information in a special frame header.

3. (Previously Presented) The data transmission system of claim 2, wherein said specific device is operable to periodically transmit the special frame header which includes the reference signal information.

4. (Previously Presented) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

the data transmission on said transmission line is performed for each transmission frame as a unit of transmission data;

each transmission frame includes a frame header which contains information indicating the head of each transmission frame, respectively, an isochronous data slot which contains the isochronous data, and an asynchronous data slot which contains the asynchronous data;

said sink device is operable to perform a processing of transmitting/receiving the asynchronous data in addition to the processing of receiving the isochronous data;

said plurality of source devices are operable to perform a processing of transmitting/receiving the asynchronous data in addition to the processing of transmitting the isochronous data; and

said specific device is operable to store the reference signal information in at least one of the isochronous data slot and asynchronous data slot and to transmit at least one of the isochronous data slot and asynchronous data slot.

5. (Previously Presented) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

said specific device is operable to transmit, to said transmission line, a transmission/receipt designation packet which contains information designating a source device as a transmission source of the isochronous data and designating a sink device as a transmission destination of the isochronous data; and

said specific device is operable to transmit a specific transmission/receipt designation packet which includes the reference signal information.

6. **(Previously Presented)** The data transmission system of claim 5, wherein said specific device is operable to periodically transmit the specific transmission/receipt designation packet including the reference signal information.

7. **(Previously Presented)** A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

said sink device and said plurality of source devices are operable to perform a processing of transmitting/receiving a data packet which contains at least one of the isochronous data and asynchronous data; and

said specific device is operable to transmit, to said transmission line, the transmission/receipt designation packet which contains information designating said sink device as a transmission source of the isochronous data, said sink device as a transmission destination of the isochronous data, and at least one of said sink device and one of said plurality of source devices as a transmission source and transmission destination of the asynchronous data, and to transmit the reference signal information by including the reference signal information in at least one of the isochronous data and asynchronous data.

8. **(Currently Amended)** A data transmission system comprising:

- a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;
- a plurality of source devices operable to transmit the isochronous data to said transmission line; and
- at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:
 - a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;
 - said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;
 - said sink device and said plurality of source devices are operable to perform a processing of transmitting/receiving a data packet which contains at least one of the isochronous data and the asynchronous data;
 - the data transmission on said transmission line repeatedly performs a unit transmission processing for transmitting data in a fixed time period;
 - said plurality of source devices and said sink device are operable to transmit the data packet in each transmission cycle as the period of the unit transmission processing to perform arbitration for obtaining a transmission right to transmit the data packet, and to transmit the data packet between a transmission source device which obtains the transmission right of the data packet by the arbitration and a transmission destination device corresponding to the transmission source device; and
 - said specific device is operable to transmit a cycle start packet which indicates a start timing of the transmission cycle as the period of the unit transmission processing for each fixed time period, and to transmit the reference signal information to said

transmission line by including the reference signal information in at least one of the isochronous data and asynchronous data.

9. (Previously Presented) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

a plurality of individual transmission systems are formed, each individual transmission system including at least one of said plurality of source devices and at least one of said sink device;

one specific device from among the at least one source device and said at least one sink device constituting each of the individual transmission systems is operable to transmit the reference signal information to the device other than said specific device in the individual transmission system including said specific device; and

the device other than said specific device in each of the individual transmission systems is operable to receive the reference signal information transmitted from said specific device, and to reproduce a reference signal which is inherent to each of the individual transmission systems.

10. (Previously Presented) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

said sink device comprises a phase detector which is operable to detect a phase shift amount of the received plurality of pieces of isochronous data, and said sink device is operable to transmit phase difference information which indicates the phase shift amount detected by said phase detector; and

at least one of said plurality of source devices is operable to modify a timing of reproducing the reference signal from the reference signal information based on the phase difference information which is transmitted from said sink device so as to reduce the phase shift amount in said sink device.

11. (Previously Presented) A data transmission system comprising:

a source device operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle;

a sink device operable to receive the isochronous data which have been transmitted from said source device; and

first and second transmission lines which have different data transmission directions and which connect said source device and said sink device in a one-to-one relationship; wherein:

said first transmission line is a low-speed transmission line having a low data transmission rate, and is operable to transmit data from said sink device to said source device,

said second transmission line is a high-speed transmission line having a data transmission rate that is higher than the transmission rate of said first transmission line, and is operable to transmit data from said source device to said sink device;

said sink device is operable to perform an information transmission processing of transmitting, to said source device via said first transmission line, reference signal information for reproducing a predetermined reference signal as a reference of a processing timing of the isochronous data;

said source device is operable to perform a signal reproduction processing of receiving the reference signal information from said sink device and reproducing the predetermined reference signal from the received reference signal information, and a data transmission processing of transmitting the isochronous data to said sink device via said second transmission line in synchronization with the reproduced predetermined reference signal; and

a transmission speed of the isochronous data on said second transmission line is higher than a transmission speed of the reference signal information on said first transmission line.

12. (Previously Presented) The data transmission system of claim 11, wherein:

said sink device and said source device are operable to perform a processing of transmitting/receiving asynchronous data to be processed at an arbitrary timing;

the data transmission on each of said first and second transmission lines is performed for each transmission frame as a unit of transmission data,

data transmission from said sink device to said source device is performed in a unit of a first transmission frame, which has a frame header indicating the head of each

transmission frame, and an asynchronous data slot containing the asynchronous data to be processed at an arbitrary timing;

data transmission from said source device to said sink device is performed in a unit of a second transmission frame which has the frame header, an isochronous data slot containing the isochronous data, and the asynchronous data slot; and

said sink device is operable to transmit the reference signal information by including the reference signal information in the frame header of the first transmission frame.

13. (Previously Presented) The data transmission system of claim 12, wherein said sink device is operable to transmit the frame header including the processing timing information in a fixed cycle.

14. (Previously Presented) The data transmission system of claim 11, wherein:

said sink device and said source device perform a processing of transmitting/receiving asynchronous data to be processed at an arbitrary timing;

the data transmission on each of the transmission lines is performed for each transmission frame as a unit of transmission data,

data transmission from said sink device to said source device is performed in a unit of a first transmission frame which has a frame header indicating the head of each transmission frame and an asynchronous data slot containing the asynchronous data to be processed at an arbitrary timing;

data transmission from said source device to said sink device is performed in a unit of a second transmission frame which has the frame header and an isochronous data slot containing the isochronous data and the asynchronous data slot; and

said sink device is operable to transmit the reference signal information by including the reference signal information in the asynchronous data.

15. (Previously Presented) The data transmission system of claim 11, wherein:

said sink device is operable to store, in a transmission/receipt designation packet, information which designates a device as a transmission source of the isochronous data

and a device as a transmission destination of the isochronous data, and to transmit the transmission/receipt designation packet to said first transmission line; and

a specific transmission/receipt designation packet which is transmitted from said sink device includes the reference signal information.

16. (Previously Presented) The data transmission system of claim 15, wherein said sink device is operable to periodically transmit the specific transmission/receipt designation packet including the reference signal information.

17. (Previously Presented) The data transmission system of claim 11, wherein:
said sink device is operable to perform a processing of transmitting/receiving asynchronous data to be processed at an arbitrary timing, to perform a processing of storing, in a transmission/receipt designation packet to be transmitted to said first transmission line, information which designates a device as a transmission source of at least one of the isochronous data and the asynchronous data and a device as a transmission destination of at least one of the isochronous data and the asynchronous data, and to store the reference signal information in a required asynchronous data packet from among asynchronous data packets including the asynchronous data to be transmitted to said first transmission line; and

said source device is operable to perform a processing of transmitting/receiving the asynchronous data to be processed at an arbitrary timing in addition to transmitting an isochronous data packet which contains the isochronous data to said second transmission line.

18. (Previously Presented) The data transmission system of claim 1, wherein at least one of said first and second transmission lines is composed of an optical fiber.

19. (Previously Presented) The data transmission system of claim 1, wherein
said sink device and said plurality of source devices are operable to transmit/receive data as an optical signal; and
said transmission line comprises:

an optical star coupler having a plurality of input terminals and a plurality of output terminals, said optical star coupler being operable to output the optical signal which has been supplied to any one of said plurality of input terminals from all of said plurality of output terminals;

output side optical fibers operable to connect output terminals of said sink device and said plurality of source devices and said plurality of input terminals of said optical star coupler; and

input side optical fibers operable to connect input terminals of said sink device and said plurality of source devices and said plurality of output terminals of said optical star coupler.

20. (Previously Presented) The data transmission system of claim 11, wherein:

said sink device is operable to transmit output data as an electric signal and to receive input data as an optical signal;

said source device is operable to transmit output data as an optical signal and to receive input data as an electric signal;

said first transmission line for transmitting data from said sink device to said source device is composed of a conductor which propagates the electric signal; and

said second transmission line for transmitting data from said source device to said sink device is composed of an optical fiber which propagates the optical signal.

21. (Currently Amended) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for

reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

at least one of said plurality of source devices is respectively connected to ~~at least one of~~ a video data output unit which has at least one of an image-taking unit operable to perform an image-taking processing; and a video reproduction unit operable to perform a reproduction processing for video data, and said at least one of said plurality of source devices is operable to transmit the video data output from said video data output unit to said transmission line as isochronous data; and

said sink device is connected to a video processing device operable to at least one of compose and record a plurality of pieces of video data, and said sink device is operable to receive the plurality of pieces of video data which have been transmitted from said plurality of source devices as isochronous data so as to supply the plurality of pieces of video data to said video processing device.

22. (Previously Presented) The data transmission system of claim 21, wherein at least one of said plurality of source devices comprises a video compression unit operable to compress the video data which have been supplied from said video data output unit and to output compressed video data, and said at least one of said plurality of source devices is operable to transmit the compressed video data as the isochronous data.

23. (Currently Amended) A data transmission system comprising:

a transmission line operable to transmit isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle, and asynchronous data to be processed at an arbitrary timing;

a plurality of source devices operable to transmit the isochronous data to said transmission line; and

at least one sink device operable to receive a plurality of pieces of the isochronous data which have been transmitted to said transmission line; wherein:

a specific device which is one of said sink device and said plurality of source devices is operable to transmit, to said transmission line, reference signal information for reproducing a predetermined reference signal as a reference for a processing timing of the isochronous data;

said plurality of source devices other than said specific device are operable to receive the reference signal information which has been transmitted to said transmission line, to obtain the predetermined reference signal, and to output the isochronous data which are synchronized with the reference signal;

said sink device, said plurality of source devices, and said transmission line which connects said sink device and said plurality of source devices are mounted on a motor vehicle;

at least one of said plurality of source devices is respectively connected to ~~at least one of~~ a motor-vehicle-mounted video data output unit having at least one of an image-taking unit which is operable to perform an image-taking processing; and a video reproduction unit which is operable to perform a reproduction processing for video data, and said at least one of said plurality of source devices is operable to transmit the video data which have been output from said video data output unit as the isochronous data to said transmission line;

said sink device is connected to a motor-vehicle-mounted video processing device which is operable to at least one of compose and record a plurality of pieces of video data, and said sink device is operable to received the plurality of pieces of video data which have been transmitted from said at least one of said plurality of source devices as the isochronous data so as to supply the data to said video processing device; and

said sink device, said at least one of said plurality of source devices, and said transmission line constitute a network for transmitting the video data in the motor vehicle.

24. (Previously Presented) A data transmission method for transmitting isochronous data to be processed at a timing in synchronization with a reference signal having a fixed

cycle and asynchronous data to be processed at an arbitrary timing from a plurality of source devices as transmission sources of the isochronous data to at least one sink device as a transmission destination of the isochronous data via a transmission line, said method comprising:

transmitting reference signal information for reproducing a predetermined reference signal as a reference of a processing timing of the isochronous data from a specific device from among the sink device and the plurality of source devices to the transmission line, and outputting isochronous data from the plurality of source devices in a timing that is synchronous with the reproduced reference signal;

receiving the reference signal information transmitted in said transmitting of the reference signal information to the transmission line, and reproducing the reference signal in the plurality of source devices; and

receiving, in the sink device, the isochronous data respectively outputted from the plurality of source devices in a timing that is synchronous with the reference signal, and outputting the plurality of pieces of received isochronous data to an external data processing device in a timing that is synchronous with the reference signal.

25. (Currently Amended) A data transmission ~~system~~method for transmitting isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle from a source device as a transmission source of the isochronous data to a sink device as a transmission destination of the isochronous data;

wherein said ~~system~~ comprises:

~~said source device and said sink device; and~~

~~first and second transmission lines which are operable to connect~~ is connected to said source device ~~and said sink device~~ in a one-to-one relationship via first and second transmission lines, said first transmission line being a low-speed transmission line having a low data transmission rate and being operable to transmit data from said sink device to said source device, and said second transmission line being a high-speed transmission line having a higher transmission rate than the transmission rate of said first transmission line and being operable to transmit data from said source device to said sink device;

wherein said ~~system is operable to perform operations comprising method~~
comprises:

transmitting reference signal information for reproducing a predetermined reference signal as a reference of a processing timing of the isochronous data from said sink device to said source device via said first transmission line;

receiving the reference signal information from said sink device, and reproducing the predetermined reference signal in said source device; and

transmitting the isochronous data to said sink device via said second transmission line in synchronization with the reproduced predetermined reference signal; and

wherein a transmission speed of the isochronous data on said second transmission line is higher than a transmission speed of the reference signal information on said first transmission line.

26. (Canceled)

27. (Currently Amended) A data transmission apparatus which is connected to a transmission line and which at least one of transmits and receives isochronous data to be processed at a timing in synchronization with a reference signal having a fixed cycle and asynchronous data to be processed at an arbitrary timing via the transmission line, said apparatus comprising:

a controller operable to control the transmission or receipt of the isochronous data and asynchronous data;

a reference signal generator operable to reproduce the reference signal based on reference signal information for reproducing a predetermined reference signal as a reference of a processing timing of the isochronous data, which have been received as the asynchronous data; and

an image-taking unit operable to perform an image-taking processing and to output video data; wherein:

said image-taking unit is operable to output the video data in synchronization with the reference signal which has been reproduced by said reference signal generator; and

said controller is operable to transmit the video data which have been output from said image-taking unit as the isochronous data to said transmission line.

28. (Previously Presented) The data transmission apparatus of claim 27, further comprising

a video compression unit operable to compress the video data outputted from said image-taking unit and to output compressed video data, wherein

said controller is operable to transmit the compressed video data as the isochronous data.

29. (Previously Presented) The data transmission system of Claim 11, wherein said transmission line is composed of an optical fiber.

30. (Currently Amended) The data transmission system of Claim 11, wherein:

said source device is connected to ~~at least one of~~ a video data output unit having at least one of an image-taking unit which is operable to perform an image-taking processing and a video reproduction unit which is operable to perform a reproduction processing for video data, and said source device is operable to transmit the video data output from said video data output unit to said transmission line as isochronous data; and

said sink device is connected to a video processing device which is operable to ~~at least one of~~ compose ~~and or~~ record a plurality of pieces of video data, and said sink device is operable to receive the plurality of pieces of video data which have been transmitted from said source device as isochronous data so as to supply the data to said video processing device.

31. (Previously Presented) The data transmission system of Claim 30, wherein said source device comprises a video compression unit which is operable to compress the video data which have been supplied from the video data input unit and to output compressed video data, and said source device is operable to transmit the compressed video data as the isochronous data.

32. (Currently Amended) The data transmission system of Claim 11, wherein:

said sink device, said source device, and said transmission line which connects said sink device and said source device are mounted on a motor vehicle;

said source device is connected to ~~at least one of~~ a motor-vehicle-mounted video data output unit having at least one of an image-taking unit which is operable to perform an image-taking processing and a video reproduction unit which is operable to perform a reproduction processing for video data, and said source device is operable to transmit the video data which have been output from said video data output unit as the isochronous data to said transmission line;

said sink device is connected to a motor-vehicle-mounted video processing device which is operable to ~~at least one~~ compose or record a plurality of pieces of video data, said sink device is operable to receive the plurality of pieces of video data which have been transmitted from said source device as the isochronous data so as to supply the data to said video processing device; and

said sink device, said source device, and said transmission line constitute a network for transmitting the video data in the motor vehicle.